Software Project Management Plan (Low-Control)

Title:	*GEOLAB Software Development and Maintenance*
Prepared by:	*William T. Jones, RFC*
Signature:	
Date:	*July 8, 2001*
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Date:	
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SEPG Form 70: Document Revision Record

Issue Date	Description of Revision (Include reason for change if not self-evident.)	Section Affected	Prepared By	Authorized By
10/22/99 01/20/00 07/08/01	Initial Release 1st Revision (Configuration Item Identifiers Spec.) Revision 2 (Title, Dates, Responsibility roles)	All 11.3.1.1 4.,5.1, 5.3, 6., 7., 10. 11.2.3, 11.3.1.13, 11.3.4.1, 11.5	Jones Jones Kerr	Kerr Kerr Kerr

Software Project Management Plan

Software Project Title: GEOLAB Software Development and Maintenance	
File Name and Version: GEOLAB-SPMP-ver1-rev2.doc **Date of Issue:** July 8, 2001	**Software Class:** Low Control
Schedule Start Date: June 8, 2001	**Schedule End Date:** January 31, 2008
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1. Requirements

See the TECHNICAL DISCUSSION of the individual Subtask Plan.

2. Life Cycle and Approach

The life cycle chosen for this development is a tailored version of option "D" as defined in Appendix I of LMS-CP-5528 (i.e., Software Project Startup including User Requirements Analysis, Software Requirements Analysis Phase, Coding and Testing Phase, Software Qualification/Validation Phase, Acceptance Support Phase, and Maintenance Phase.) An incremental development approach (series of incremental builds) will be used during the development.

3. Deliverables

See the SCHEDULE AND DELIVERABLES ITEMS of the individual Subtask Plan.

4. Trade Study and Purchases

As the CONITS contractors have demonstrated their ability to perform the specified IT services through a competitive procurement process, no other study is deemed necessary. No purchases are required.

5. Reviews, Verification, and Validation

5.1 Joint Reviews

Joint Reviews will be conducted on a weekly basis unless otherwise specified by the Acquiring Software Manager and any GEOLAB customers participating in the definition of the technical requirements.

5.2 Verification

5.2.1 Documentation

Prior to draft and final delivery, any generated documents will be reviewed internally by a GEOLAB team member other than the author to ensure that they are correct, complete, clear, and in conformance with the requirements specified in the CONITS TA-RFC005 Geometry Laboratory (GEOLAB) Support.

5.2.2 Software Requirements

Members of the GEOLAB team will provide functional testing through internal execution of the software package. New software packages will be benchmarked against legacy code where possible. In keeping with the Incremental Development Approach, regression testing will be performed with each build. The results of all modifications and enhancements will be presented to the Acquiring Software Manager for review and verification prior to delivery. The presentations shall be in accordance with established agreements defined in the CONITS TA-RFC005.

5.2.3 Unit and Integration Testing

Unit and Integration Testing will be performed on all software prior to the start of the Qualification/Validation Phase to ensure that the software items perform correctly according to their requirements. Records of these tests will be kept in the package Test Logs on the Data Analysis and Imaging Branch (DAIB) GEOLAB workstations under the directory /usr/local/inhouse/Software/<package>/Tests/log where <package> denotes each specific GEOLAB software product.

5.3 Validation

The Software Qualification Test Procedures will be performed on an as-developed basis in accordance with the CONITS TA-RFC005.

The tests will be performed by a GEOLAB team member other than the software developer. Maintenance of legacy software will be subject to internal testing and validation of all updates against standard test cases to include, but not limited to, the generic wing-body geometry and the generic business jet configuration. Test cases are located on the GEOLAB workstations in the directory /usr/local/inhouse/Software/TESTS/testdata/<config> where <config> represents the name of the test configuration. A file named README will contain descriptions of the files contained within each test case directory. The LaRC Software Manager will verify all modifications before inclusion into production areas.

6. Development Schedule

See the SCHEDULE AND DELIVERABLE ITEMS in the Subtask Plan. A software outline may be substituted for the Subtask Plan for development of software for use internal to the GEOLAB team.

Attachment 1 contains a copy of LaRC Form 193 augmented with the required data. It will be resubmitted (via e-mail) whenever changes occur.

Attachment 2 contains the additional metrics data (to date) required in the CONITS TA-RFC005. Attachment 2 will be updated and resubmitted at project completion and again 6 months after project completion.

Monthly Status Reports (as specified in the CONITS TA-RFC005) will be delivered within three working days of the end of each month.

7. Acceptance Criteria and Procedure

The Software Qualification Test Procedures will be performed at the GEOLAB site at the time specified in the schedule above and in accordance with the 'Acceptance Criteria and Procedure' specified in the CONITS TA-RFC005. By performing the Software Qualification Test Procedures and performing system checks after test execution, the Contractor will validate that the software performs the functions claimed on the platform for which it was designed without harm to the system or the data contained in the system. Software capabilities will be demonstrated to the User following internal testing at which time the User will be given access to the software executable. The results of any User testing will be expected following 2 weeks of User access to the software executable.

8. Risk Management
Risk management will be documented in each SubTask Plan.

9. Installation and Operations
Deliverable versions of the Software package executables will be installed on the GEOLAB workstations under /usr/local/inhouse/bin and are accessed through this path using the package executable name. The deliverable Software source will be placed in a production area located on the GEOLAB workstations as /usr/local/inhouse/Software/<package> where <package> denotes the software package name. GEOLAB Software Development Kit (SDK) libraries will be maintained under /usr/local/inhouse/lib with /usr/local/inhouse/include serving to house the documented header files required by the SDK and satisfying the requirements of the SAP. All installations will make use of UNIX symbolic links to the source directories (/usr/local/inhouse/Software/<package>) to reference the current build of all software products.

10. Maintenance
The software maintenance activities will be performed according to the schedule defined the CONITS TA-RFC005 and associated individual subtask plans. Modification histories will be maintained in each delivery package source directory listed in Section 9 in the file "*ModificationHistory*". Configuration Management of changes is covered in Section 11 below. Request prioritization, analysis, and approval are specifically covered in Section 11.2.3. The same life cycle and approach specified in section 2 above will be used to implement all approved maintenance changes.

11. Configuration Management Plan
11.1 Introduction
This plan contains the software configuration management planning information required by LMS-CP-5528.

11.2 Software Configuration Management (SCM)
11.2.1 The Software Configuration Manager is William T. Jones.
11.2.2 N/A.
11.2.3 Control Responsibilities
Name of group: Configuration Control Board (CCB)
Purpose: To manage change requests and trouble reports.
Membership: Acquiring Software Manager, the CSC Software Manager, and any GEOLAB Users.
Approval authority: Acquiring Software Manager
Period of effectiveness: A CCB will continue to operate for the life of each GEOLAB software development/maintenance project.
Scope of authority: All GEOLAB software related change requests and trouble reports.
Operational procedures: The GEOLAB software Configuration Control Board (CCB) will review all recommended change requests and trouble reports, for approval, to baselined products before implementation. The CCB membership is made up of the Acquiring Software Manager (Chairman), the LaRC Software Manager, and the CONITS Software Manager. Requested changes and trouble reports will be tracked as email messages to the CCB as dictated by the SAP. If deemed appropriate, the Acquiring Software Manager will (via the email) indicate that CONITS/GEOLAB personnel should analyze the request. The LaRC Software Manager will coordinate with the CONITS Software Manager in the convening of the CCB, approval/disapproval of all requested product changes, and defining acceptance criteria for approved changes. It is the responsibility of the CONITS Software Manager to ensure that the test procedures are updated accordingly. During the CCB meeting, the Acquiring Software Manager will provide CONITS/GEOLAB personnel the priority order in which change requests and trouble reports should be addressed. The CONITS Software Manager will record all CCB meeting decisions and actions, e-mail the initiator the decision made concerning the request and, if the change is approved, notify the requestor once the change is complete.

11.3 SCM Activities
11.3.1 Configuration identification

11.3.1.1 Configuration Items (CI) will include: the software source (denoted with .c, .c++, .cc, .f, .F, .i, or .java extensions); included header files (denoted with .h extensions); object code (denoted with .o and .class extensions); and build scripts (Makefile, Makefile.*). The standard extensions listed follow in accordance with the standard UNIX and Microsoft NT development environments. Configuration Items will be maintained file system directories named from a unique package identifier and located under /usr/local/inhouse/Software/. Each package identifier shall contain the following information:

{Product ID}- {version}.{revision}.{update}

where

{Product ID} = Abbreviated title of the software package,
{version} = Version number, incremented by one each time the CI is baselined, and
{revision} = Revision number, incremented by one for each change to the current version.
{update} = If present, represents a minor revision prior to the next release.

Additional Configuration Items must also be given a unique identifier. The identifier must contain the following information:

{Project ID}-{Product ID}-ver{number}-rev{number}

where

{Project ID} = GEOLAB,
{Product ID} = Abbreviated title of the product,
ver{number} = Version number, incremented by one each time the CI is baselined, and
rev{number} = Revision number, incremented by one for each change to the current version.

11.3.1.2 The Configuration Item List is provided in Attachment 3.

11.3.1.3 Configuration Item List maintenance

The initial version of the Configuration Item List will be attached to the Proposed SPMP. Changes to the list will be made by the SCM manager and approved by the Acquiring Software Manager prior to posting to GEOLAB workstations under the /usr/local/inhouse/Software/<package>/Documentation directory.

11.3.1.4 The retention period for each CI is 2 months after an item is superceded.

11.3.1.5 At the end of the specified retention period all data will be disposed of or the retention period will be extended. Electronic data will be deleted or thrown away. All physical records will be thrown away or marked as historical reference.

11.3.1.6 Backup files will be stored on the LaRC Distributed Mass Storage System (DMSS) and internal GEOLAB system backups.

11.3.1.7 Back-up information:

a. Restoration contact: William T. Jones

b. Host and path: Standard system backups of the GEOLAB workstations will serve as the primary backup source. A complete backup, to LaRC Distributed Mass Storage System (DMSS), of all project electronic files on the GEOLAB workstations, /usr/local/inhouse/Software directories, will be performed with each delivery. All files required for a complete build of each software package will be archived as a UNIX tar file located in /usr/local/inhouse/Software/Archive/<package>-Vver.rev.tar.gz prior to installation of later versions of the package.

c. Frequency of backups: Backups will be performed nightly beginning at 7:00 p.m. via an automated script.

d. Duration that backup files will be retained: Backups will be maintained for at least two backup intervals.

11.3.1.8 Location for physical records

Physical storage of project materials will be located in Building 1268, room 1056, in the file drawer labeled "GEOLAB Records."

11.3.1.9 Labeling media

It is not anticipated that removable media (e.g. disks or tapes) will be used. However, if the need should arise, the media label shall contain the information required in LMS-CP-5529.

11.3.1.10 Software Configuration Index Record/ Software Version Description

When a Configuration Item(s) is released for delivery to the requester, it shall include a Software Configuration Index Record/ Software Version Description with the following:

a. Project Title,
b. Date of delivery,
c. Issuing Organization,

d. Inventory of all delivered items (i.e. unique CI identifier, description, date and time file last saved, and the location on the GEOLAB workstations),
e. Instructions for CI use (i.e. instructions for building the executable object code, data for compiling and linking, the procedure used to recover software, and perform regression testing or modifications)
f. All changes installed on this release,
g. Identification of all known problems

11.3.1.11 Configuration management tools

Configuration management will be recorded through electronic mail and appropriate entries into the GEOLOG database. In addition, the GEOLAB project system will be used to manage software development and maintenance activities (/usr/local/inhouse/Projects). Each software development or maintenance activity will be conducted in an appropriate GEOLAB project named for the corresponding package. Development and modifications will be conducted in the working/ directory within the project directory structure. Upon completion, deliverable items will be moved to the outgoing/ directory also contained within the project directory structure and will be placed in a subdirectory named according to "delivery_mmddyy" where mm, dd, and yy correspond to the month, day, and year respectively of the delivery date. After delivery, installation will follow that outlined in Section 9 above. The GEOLAB project used for development/modification will be removed after installation.

11.3.1.12 Baselining

All products will be baselined after completing the applicable verification and validation activities (as specified in section 5) by moving them from their respective development area described in Section 11.3.1.11 to the GEOLAB production area (/usr/local/inhouse/Software/<package>-Vver.rev). Changes to baselines will be performed as described in 11.3.2. Installation will include updating UNIX symbolic links of Section 9 to point the current baseline. Baselined files will have read access only. Personnel access to baselines will be controlled as specified in 3.1.13.

11.3.1.13 Access authorization

Only CONITS/GEOLAB personnel will have access permission to the computer directories that are used for the development of the software. This access control will be by LOGON user-id and password and the use of UNIX groups. User-id and password also protect access to the GEOLAB workstations.

11.3.1.14 Electronic file locations

The list of electronic file locations is provided in Attachment 4.

11.3.2 Configuration control

The project will implement the following configuration control actions for software baselines :

a. Request for change (e.g., error and trouble reporting or enhancement request): Electronic mail to the Acquiring Software Manager will be used to make requests for changes and trouble reports. The Acquiring Software Manager will play the role of "Software Engineering Manager".

b. Evaluation of change requests: Change requests will be evaluated by the CCB for disposition.

c. Disposition of change requests (i.e., approve, disapprove, or defer): Disposition of the change requests is performed by the CCB as defined in Section 11.2.3 Operational Procedures.

d. Verification, implementation, and release of changes: These activities will be performed in the same manner whether it is for changes to the initial delivered baselines or for subsequent changes to the baselines during maintenance (see Sections 2, 5, and 7).

11.3.3 Configuration status accounting

Baselines are stored in the directories specified in Attachment 4. The unique identifier with the highest version number is the most recent baseline. Additional information can be obtained via email from the Acquiring Software Manager.

11.3.4 Configuration audits and reviews

11.3.4.1 The CONITS Software Manager will review the files delivered on the GEOLAB workstations under the appropriate GEOLAB project directory '/usr/local/inhouse/Projects/<package>/outgoing/delivery_mmddyy' to verify that they match the latest version in the '/usr/local/inhouse/Projects/<package>/working' directories prior to transmitting the e-mail notification of delivery to the Acquiring Software Manager. The Software Configuration Index Record will be reviewed to verify that it is correct prior to delivery. A record documenting the reviews is recorded in the Delivery Review Log.

11.3.4.2 N/A

11.3.5 Interface control
N/A
11.3.6 Subcontractor control
N/A

11.4 SCM Schedules

The schedule in section 6 of this plan specifies when deliveries will be made.

11.5 SCM Resources

The Configuration Versioning System (CVS) will be evaluated for use with major software development efforts.

Attachment 1: LaRC Form 193

DEVELOPMENT SCHEDULE FOR LOW, HIGH, AND CRITICAL CLASS SOFTWARE

PROJECT NAME	SOFTWARE CLASS	START DATE	END DATE	ASSIGNED EMPLOYEE OR CONTRACT COMPANY	SOFTWARE MANAGER (Indicate *)	ORG CODE	WORK PACKAGE OR WBS ELEMENT	FULL TIME EQUIVALENT (FTE)	SPMP LOCATION
GEOLAB Software Development and Maintenance	Low	01/20/00	03/31/00	CSC	William T. Jones	RFC	N/A	See Labor Estimate of the Subtask Plan	DAIB Branch GEOLAB workstations, /usr/local/inhouse/Software/<package>/Documentation, Room 1051

Attachment 2: Additional Metrics

Type of Metrics	Metrics Data
Project Completion Metrics (provided at project completion, prior to the start of maintenance)	**Required:** Estimated Start Date = January 20, 2000 Estimated Completion Date = March 20, 2000 Estimated Total Staff Hours = See Labor Estimate of the Subtask Plan Estimated Total Cost = The estimated cost has been provided to the COTR on the Technical Specification form for this project. Actual Start Date = Actual Completion Date = Actual Total Staff Hours = Actual Total Cost = Total Executable Source Lines of Code for Each Language Used COTS or GOTS Tool(s) Used and Comment on Satisfaction Platforms **Optional:** Methods Used and Comment on Satisfaction Lessons Learned and Feedback Best Practices
Maintenance Metrics (provided six months after project completion)	Number of approved problem reports implemented = Hours spent performing the corrections =

Attachment 3: Configuration Item List

Description	**Unique name**
Software Project Management Plan	GEOLAB-SPMP-ver1-rev1
Configuration Item List	GEOLAB-CIL
Test Log	GEOLAB-TL{month-day-year}
Delivery Review Logs	GEOLAB-DRLog
Software Configuration Index Record (i.e. Software Version Description)	GEOLAB-SCIR
Source Code	Contained in <package>-ver-rev-update directory (SPMP section 11.3.1.1)
Object Code	Contained in <package>-ver-rev-update directory (SPMP section 11.3.1.1)
Executables	Contained in <package>-ver-rev-update directory (SPMP section 11.3.1.1) under bin subdirectory
Make File	Contained in <package>-ver-rev-update directory (SPMP section 11.3.1.1)
Acceptance Test Results Report	GEOLAB-ATRR
Risk Spreadsheet	GEOLAB-RS-{month-day-year}
Monthly Status Report	GEOLAB-MSR-{month-day-year}

Attachment 4: List of Electronic File Locations

Note: In the following <package> denotes the package identifier defined in section 11.3.1.1 of the SPMP.

During development, computer files will be maintained according to the following directory structure.

File Type	Location Type	Location
Source code	Host and path	GEOLAB workstations, /usr/local/inhouse/Projects/<package>/working/src
Object code	Host and path	GEOLAB workstations, /usr/local/inhouse/Projects/<package>/working/src
Executables	Host and path	GEOLAB workstations, /usr/local/inhouse/Projects/<package>/working/src
Documentation	Host and path	GEOLAB workstations, /usr/local/inhouse/Projects/<package>/working/doc
Backups	Host and path	Nightly GEOLAB workstation cycled system backup stored in the safe of Building 1268, Room 1049. LaRC DMSS under @jones/GEOLAB/Projects/<package>/

Draft and final deliverable files will be baselined according to the following directory structure.

File Type	Location Type	Location
Source code	Host and path	GEOLAB workstations, /usr/local/inhouse/Software/<package>/
Object code	Host and path	GEOLAB workstations, /usr/local/inhouse/Software/<package>/
Executables	Host and path	GEOLAB workstations, /usr/local/inhouse/Software/<package>/bin
Documentation	Host and path	GEOLAB workstations, /usr/local/inhouse/Software/<package>/Documentation
Backups	Host and path	LaRC Distributed Mass Storage System (DMSS), Software Manager account, under GEOLAB/Software/<package>-Vver.rev.tar.gz
Archive	Host and path	GEOLAB workstations, /usr/local/inhouse/Software/Archive/<package>-Vver.rev.tar.gz
Test Log	Host and path	GEOLAB workstations, /usr/local/inhouse/Software/<package>/Tests/log
Delivery Review Log	Host and path	GEOLAB workstations, /usr/local/Software/<package>/Documentation/DLRLog